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MILITARY

OMURA GIVES INSTRUCTIONS ON FY 1983-87 MEDIUM TERM DEFENSE PROGRAM

Tokyo JPE AVIATION REPORT-WEEKLY in English No 521, 13 May 81 p 4

[Text]

State Minister for Defense (Director-General of the Defense Agency) Joji Omura gave instructions to the Joint Staff Council Chairman of the Self-Defense Forces (SDF) and the Chiefs of Staff of the three SDF services in late April on preparation of the FY 1983-87 Medium-Term Defense Program (MTDP). He said the new MTDP should aim at achieving Japan's defense capabilities stipulated in the October 1976 Defense Program Outline.

In the instructions, Omura also said that the MTDP should provide main projects and their estimated costs as the basis for annual defense operations plans and specify efficient and well-coordinated modernization and expansion of defense equipment. The Japanese Defense Agency's (JDA) work on the MTDP should be completed by approximately April 1982, he added.

The instructions were approved by the National Defense Council chaired by Prime Minister Zenko Suzuki before presentation to the SDF officers.

There were no such instructions before making the FY 1980-84 MTDP in FY 1978 because that MTDP, the first of its kind, was designed to serve only as the JDA's in-house guideline.

The FY 1983-87 MTDP, for preparation in FY 1981, will be submitted to the council as Prime Minister Suzuki has said at the Diet (parliament).

Attention is now paid to when the council will adopt the new MTDP as an official government program. As to the FY 1978 MTDP, the JDA's final decision, though planned for the end of FY 1978 or March 1979, was eventually delayed until July 1979.

The JDA intends to complete its work on the new MTDP by the end of FY 1981 or March 1982. Then, it will be submitted to the council for consideration and decision.

The three SDF services are expected to work out their respective originals by the end of September 1981 for explanation and coordination among JDA civilian officials lasting until the end of calendar 1981. Full-scale work on the new MTDP may start after the government drafts the FY 1982 budget in early January 1982.

CSO: 4120

MILITARY

SELF-DEFENSE FORCE URGED TO HASTEN EQUIPMENT PROCUREMENT IN FY 1982

Tokyo JPE AVIATION REPORT-WEEKLY in English No 521, 13 May 81 pp 5-7

[Text]

Joji Omura, State Minister for Defense and JDA Director-General, has instructed SDF leaders to hasten procurement of major equipment in FY 1982 (April 1982-March 1983) while giving consideration to logistic measures.

In his official instructions on drafting FY 1982 operations plans given to the SDF Joint Staff Council Chairman, Chiefs of Staff of the three SDF services and the Director-General of the Technical Research and Development Institute (TR&DI) late in April, Omura also asked them for efficient and rational administration to promote the government's administrative reform. The operations plans will serve as the basis for the FY 1982 budget request.

He ordered the Ground Self-Defense Force (GSDF) to continue procurement of Tan-SAM short-range surface-to-air missiles and start introduction of the AH-1S antitank helicopter in the fiscal year. The Maritime Self-Defense Force (MSDF) was asked to hasten procurement of destroyers, P-3C antisubmarine patrol planes and HSS-2B antisubmarine helicopters, while the Air Self-Defense Force (ASDF) was called on to advance F-15J fighter procurement and purchase additional C-130 transports.

As to the TR&DI's engineering development programs, Omura said that priority be given to improvement of firearms and armored vehicles. New engineering development items for FY 1982 are expected to include the XSSM-1 ground-launched antiship missile and the new main battle tank.

In response to the instructions, each SDF service will submit proposals to the JDA's internal bureaus by late May. Then, the JDA's Defense Policy Bureau and other offices involved will continue hearings on the proposals until June 13 to map out the final plans.

Main points of Omura's instructions follow:

--- Ground equipment procurement should center on antiaircraft and antitank weapons systems. Specifically, continuous procurement will involve Tan-SAM, portable SAM and Improved Hawk missiles for antiaircraft missions. As to antitank systems, Ju-MAT missiles and 84mm recoilless guns will continue to be procured. Besides, introduction of the AH-1S antitank helicopter will start.

--- The MSDF should promote procurement of antisubmarine ships and aircraft. Fleet rehabilitation and modernization programs for destroyers will be stepped up while new DD destroyers will be constructed. As for aircraft, P-3C procurement will be advanced and efforts will be made to achieve an HSS-2B procurement target.

--- The ASDF should facilitate procurement of interceptors and prepare for construction of the BADGE-X new automatic air defense system. F-15J interceptors will be procured ahead of schedule. As to the BADGE-X, an appropriate configuration will be selected with details of a construction program prepared in FY 1982 to launch construction in FY 1983.

--- Research and exercises regarding defense operations should be promoted and efforts should be made to unify command of the three SDF services. As to the planned central headquarters for the unified command, Phase-II construction of its building will be implemented in the fiscal year with communications equipment ordered. Although the GSDF's defense microwave communications network program had been planned to be completed in FY 1981, a budgetary constraint has delayed the program. The remaining work on the program will continue in FY 1982. Its completion is expected in FY 1983.

--- Logistic support measures should be facilitated to accommodate main equipment. Hangars and runways will be improved for P-3Cs, F-15Js, E-2C airborne early warning aircraft, C-130s and other aircraft. An additional four C-130 transports will be requested because the FY 1981 procurement was cut to two aircraft from the requested six.

--- Procurement, management and operation of ammunition, torpedoes, mines and other operational materials should be promoted.

--- SDF bases should improve facilities and equipment and increase rehabilitation capability to strengthen antiair defense.

--- SDF personnel measures should involve lengthened service periods, health and welfare, and medical affairs. The self-defense reserve system should be expanded.

--- Research and development activities should be promoted to contribute to qualitative improvement of defense capabilities. Engineering development in FY 1982 should put weight on weapons and armored combat vehicles. Programs for the long-range torpedoes and the MT-X intermediate trainers should also be facilitated. Technical research should involve aircraft, guided weapons and electronic equipment which are considered especially important to defense.

--- Research and development activities should give consideration to standardization of SDF weapons and their U.S. counterparts, and reduction of production and maintenance costs. Exchange of technical information with the United States should be promoted. Testing equipment for underwater weapons systems should be improved to facilitate development of torpedoes and other underwater weapons funded in the FY 1981 budget. The equipment includes hydraulic torpedo launching test systems.

CSO: 4120

MILITARY

AIR SELF-DEFENSE FORCE TO DISPATCH ACMR/I SURVEY TEAM TO U.S.

Tokyo JPE AVIATION REPORT-WEEKLY in English No 521, 13 May 81 pp 7,8

[Text]

The ASDF will send two officials to the United States from May 24 for study on the air combat maneuvering range/instrument (ACMR/I) which it wants to incorporate into the FY 1983 budget request.

Based on this study, the ASDF will map out its own ACMR/I configuration prior to the budget request.

The two ASDF officials each from the Logistics Planning and Operations Divisions will visit the U.S. Departments of Army and Air Force, ACMR/I-equipped training facilities as well as General Dynamics Corp. and Cubic Corp., which have developed the system, to take a direct look at ACMR/I operation and to hear briefing by them on system engineering of the ACMR/I.

The ACMR/I systems are set up on ground facilities under vast training spaces in Europe, the Philippines and South Korea as well as the United States. But the ASDF expects to put the systems on buoys in waters off Miyazaki in Kyushu for Offshore Training Space L.

The ASDF had planned to send the survey team in April and request funds for system engineering of the ACMR/I in FY 1982. However, the survey has been delayed and the time for the FY 1982 budget request has been advanced by about one month to late June or early July. Under the circumstances, the ASDF may draft its ACMR/I configuration in FY 1982 for system engineering in FY 1983.

System engineering and fabrication of the ACMR/I will be undertaken by Fujitsu Ltd., Nippon Electric Co. and other Japanese avionics manufacturers in cooperation with General Dynamics or Cubic.

CSO: 4120

PUBLIC FUND: TREASURY INVESTMENT, LOAN SCRUTINIZED

Tokyo TOYO KEIZAI in Japanese 4 Apr 81 pp 46-50

[Excerpt] The public pension reserve fund, because of its nature, is not permitted to be used for profitable gains regardless of the means. Called the second budget, the fund is deposited with the Trust Fund Bureau as the financial resource for the Fiscal Investment and Loan Program and is used for purposes directly linked with the people's livelihood, such as consolidating the living base and to building up social overhead capital.

Although it seems somewhat farfetched, from this standpoint, examining the fiscal investments or the problem of the Trust Fund Bureau, scrutinizing how the "people's money" is spent, cannot be ignored.

--Increasing Pressure to Reassess Fiscal Investments

Premiums for welfare pensions and national pensions are consolidated with postal savings and the Post Office Life Insurance fund and are mainly used for fiscal investments and loans.

The Fiscal Investment and Loan Program is not well known to the public but it constitutes the government's investment and loan activities, centered on paid-in capital such as the Trust Fund Bureau funds, and includes long-term (over 5 years) new investments and loans for the pertinent fiscal year. Fiscal investments for the FY-81 program amounted to 19,489,700,000,000 yen. It accounts for 40 percent of the general account budget. When it was started in FY-53, the sum was 337.4 billion yen. In FY-53 the GNP ratio was 4.5 percent, but it steadily climbed to 7.1 percent in FY-79.

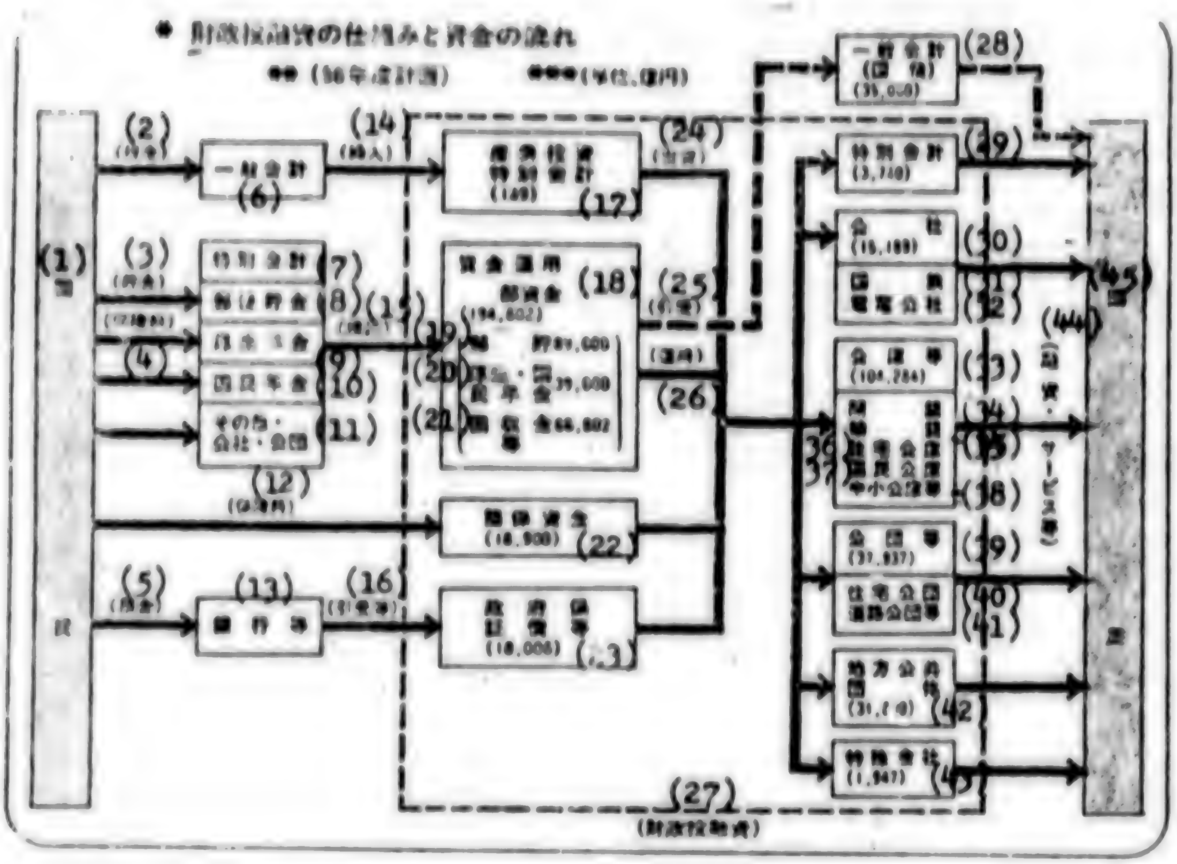
Thus fiscal investments and loans are increasing in importance, but recently pressure has increased suddenly, forcing a reassessment of the program. The investments are not suitably meeting the needs of the time, for reasons such as a sudden increase in nonessential funds, the existence of investment organs which have lost their significance, competition with nongovernmental financial institutions, etc.

Fifty-Four Organs and Local Public Bodies

First, there is the setup of the Fiscal Investment and Loan program, as shown in Table 1. The financial resources of the program are derived from four funds: the Trust Fund Bureau, the Post Office Life Insurance, the Industrial Investment Special Account and government guaranteed bonds. These funds have been channeled through the general account; special accounts such as postal savings, welfare and national pensions, etc; insurance premiums, savings and taxes collected by banks, etc; and the underwriting of government securities.

Table 1.

* Setup and Capital Flow of Fiscal Investment and Loan Program
** (FY-81 Plan) *** (Unit: Billion yen)



Key:

1. Nation's People
2. Tax Money
3. Savings
4. Insurance Premiums
5. Deposits
6. General Account
7. Special Account
8. Postal Savings
9. Welfare Pensions
10. National Pensions
11. Other Government Enterprises and Public Corporations
12. Insurance Premiums
13. Banks, etc.
14. Transfer
15. Deposit
16. Underwriting, etc.
17. Industrial Investment Special Account
18. Trust Fund Bureau Funds
19. Postal Savings
20. Welfare/National Pensions
21. Recovery Funds, etc.
22. Post Office Life Insurance
23. Government Guranteed Bonds
24. Investment
25. Underwriting
26. Operations
27. Fiscal Investments and Loans
28. General Account (Government Bonds)
29. Special Account
30. Government Enterprises
31. Japanese National Railways
32. Nippon Telegraph & Telephone Public Corporation
33. Finance Corporations, etc.
34. Japan Development Bank
35. Export-Import Bank of Japan
36. Housing Loan Corporation
37. People's Finance Corporation
38. Smaller Business Finance Corporation
39. Public Corporations, etc.
40. Japan Housing Corporation
41. Japan Highway Public Corporation
42. Local Public Bodies
43. Chartered Semigovernmental Corporations
44. Loans, Services, etc.
45. Nation's People

Of the four funds, the Trust Fund Bureau is the biggest, accounting for 82 percent. Although called the Trust Fund Bureau, there is no organization bearing that name. The former Savings Division of the Ministry of Finance was its predecessor, but at present the First and Second Capital Division, the Capital Control Division, the Regional Capital Division, the Government Depository Division, etc of the Finance Ministry's Financial Bureau handle the operations.

In accordance with the Trust Fund Bureau Law, in addition to postal savings, the reserve and surplus funds of special accounts must also be deposited with the Trust Fund Bureau. The objective is to "consolidate and control the funds in the Trust Fund Bureau and to contribute to the advancement of public benefits through reliable and profitable operations of the funds" (Article 1 of said law). The interest rate on these deposits is the same as that for interest on loans from the bureau to investment institutions such as government enterprises, finance corporations, etc.

Next, the Post Office Life Insurance is the reserve fund accumulated from the surplus in the account settlement of special accounts for Post Office Life Insurance and postal annuity. The independent operation of the Post Office Life Insurance by the Ministry of Posts and Telecommunications is recognized and is the sole exception to a centralized management of government funds in the Trust Fund Bureau's operations. However, in actuality, most of the funds are incorporated in the financial resources for fiscal investments.

The Industrial Investment Special Account was established in 1953 to reconstruct the economy and to develop industries. At present, the account is small and is never invested separately from other financial resources. With regard to government guaranteed bonds, since the government guarantees the principal and interest, these are financially endorsed capital and are considered as funds to be managed by the government itself. As compared with the Trust Fund Bureau and Post Office Life Insurance, which are passive in their operations since they handle deposits and insurance premiums, any increase in government guaranteed bonds is dependent on the government's discretionary authority.

On the basis of these four types of financial resources, a total of 54 organs including 8 special account institutions such as the Export-Import Bank of Japan, the Japan Development Bank, the Japan Housing Corporation, etc, 2 government enterprises, 11 financial corporations, etc, 28 public corporations and 5 chartered semigovernmental corporations, and local public bodies, conduct investment activities and provide loans and services to the general public.

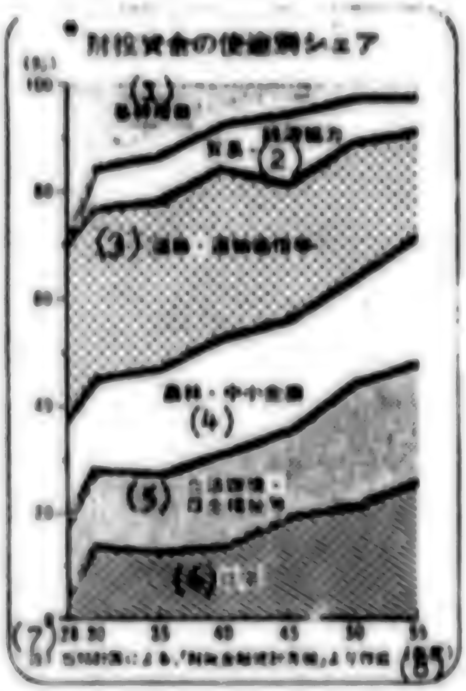
Considered the second budget, the Fiscal Investment and Loan Program is used to control business conditions and is closely related to the general account budget. The capital flow shown in Table 1 denotes the underwriting of government bonds (general account income) with Trust Fund Bureau funds. It must not be overlooked that from the general account, supplementary funds flow to investment organs such as the Japanese National Railways, Japan Housing Corporation, etc.

Long Way to "Meeting the Demand of the Time"

By examining the transition of investment objectives of the funds thus collected, the respective changes in the type of investments, according to time periods, can be seen.

Table 2.

* Share of Fiscal Investment Objectives



Key:

1. Key Industries
2. Trade Promotion and Economic Cooperation
3. Road Improvement/Transportation and Communications
4. Agriculture, Forestry & Fishery/Medium-Small Enterprises
5. Public Service Facilities/Social Welfare
6. Housing
7. Note: According to the first plan; prepared from "Public Finances and Fiscal Statistics Monthly"
8. Years: 28 (1953)
   30 (1955)
   35 (1960)
   40 (1965)
   45 (1970)
   50 (1975)
   55 (1980)

The transition is shown in Table 2. During the 1940's, emphasis was placed on providing capital investment to key industries to rebuild the economy. During the 1950's, to promote a high growth rate, improvement of the industrial bases such as roads, transportation and communications and the modernization of medium-small enterprises were stressed. Priority was shifted to housing, public service facilities, social welfare and education only after the 1960's. In FY-80, the latter two categories constituted 48.2 percent of the total.

It is a fact that investment priorities were shifted with the changing times, and the investments contributed to the high growth rate of the Japanese economy. However, at present, when the growth rate has slowed down, investment operations have not been altered to meet the needs of the time.

An example is the sudden increase in nonessential funds. The rapid increase began in FY-77, and in FY-78 the figure reached 1,546,500,000,000 yen, [sic] or 10 percent of the investment program. The trend continued in FY-79, totaling 728.4 billion yen, and climbed to 4.3 percent. In the past, at the most, it was about 1 percent.

In FY-79, with the Export-Import Bank of Japan heading the list with 374 billion yen, five institutions, including the Agriculture, Forestry & Fishery Finance Corporation, had over 50 billion yen in nonessential funds. The increase in nonessential funds for the past several years raises doubts as to the fund distribution for fiscal investments.

Together with nonessential funds, funds carried forward have increased. In FY-78, the sum reached 20.9 percent of the program. Of course, since fiscal investments for the year might be conducted toward the latter half of the fiscal year and the issuance of local government bonds takes place during the settlement period of receipts and disbursements (April-May of the following year), the increase in funds carried forward does not necessarily mean a great loss in fund distribution for investments.

However, there is no question that increases in nonessential funds and carried-over funds obstruct the effective use of the funds' fiscal investments and must be reassessed from the standpoint of financial reconstruction and administrative reform.

For example, when administrative reforms are considered, there are a number of organs the existence of which becomes questionable from an operational standpoint, such as the Forest Development Corporation, the Japan Railway Construction Corporation, the Environmental Sanitation Business Finance Corporation, the Hokkaido & Tohoku Development, etc.

Furthermore, the assurance of returns from fiscal investment resources becomes problematical. Since the 1960's, emphasis has increased on areas which the Finance Ministry terms "social welfare," such as housing, environmental improvement, education, social welfare, medium-small enterprises, etc. Investments and loans in these areas are liable to be inconsistent in earinings. As a result, investment organs such as the Japanese National Railways, the Housing Loan Corporation, the Japan Housing Corporation, the Agriculture, Forestry & Fishery Finance Corporation, the Japan Highway Public Corporation, etc must be subsidized by the general account budget. The subsidy increases and must be borne by the people in the form of taxes.

Specifically, the Trust Fund Bureau, of which the principal capital is postal savings, can presently lend to the Housing Loan Corporation at 8 percent interest, while the loan interest charged by the corporation is 5.5 percent, so the gap must be subsidized through the general account (taxes). The Agriculture, Forestry & Fishery Finance Corporation and others operate under the same mechanism.

During the 1950's the Housing Loan Corporation and others were actually self-supporting, but starting in the 1960's they had deficits which had to be covered by the general account, and since 1972, because of the back spread, the subsidy has snowballed.

Another reason why a reappraisal of the operational activities of the fiscal investment organs is desired is the competition with nongovernmental monetary institutions. As can be seen in the hotel loans by the Japan Development Bank, loans by government-affiliated monetary institutions to tertiary and service industries and housing financing are increasing. This is an area which nongovernmental fiscal organizations are trying to cultivate, in which they would be openly competing with government-affiliated organs. Also, the competition is increasing in the sphere of medium-small enterprises and the long-term, low-interest loans of government-affiliated institutions are becoming a "government pressure on civilian businesses" as far as nongovernmental fiscal outfits are concerned.

As described above, from the standpoint of the effective use of funds, competition with civilians, financial reconstruction and administrative reforms, a thorough reassessment of the operational activities of the unchanging fiscal investment organs is called for.

--Trust Fund Bureau Is Hidden Behind a Secret Veil

Since the Trust Fund Bureau accounts for over 80 percent of the financial resources of the Fiscal Investment and Loan Program, problem areas in fiscal investments are inevitably reflected directly in the bureau operations.

Examination of the Trust Fund Bureau's balancesheet as of late January 1981 shows that the capital is the huge sum of 97,424,100,000,000 yen, or just short of 100 trillion yen. Because of mid-fiscal figures, long-term government bonds constitute a large share and amount to nearly 15 trillion yen (15.3 percent of total), but the main loan items are to government-related organs (40 trillion yen; 41.1 percent), local public bodies (nearly 14 trillion yen; 14.2 percent), special juridical bodies (14.73 trillion yen; 15.1 percent) and general and special accounts (10.63 trillion yen; 10.9 percent).

On the other hand, in revenues, deposits such as postal savings, etc amount to 60.23 trillion yen (61.8 percent) and occupy a large share of the capital. Next, welfare pension insurance is nearly 26 trillion yen (26.7 percent), and national pensions total 2.4 trillion yen (2.5 percent).

In 1980 the drastic increase in postal savings had various repercussions, but even in the Trust Fund Bureau, postal savings increased by 9.2 trillion yen in 10 months. As compared with the 6.55 trillion yen for the same period of the previous year, this was an increase of over 40.5 percent.

In fund procurement, because of the noticeable increase in postal savings, the growth in 1980 was favorable but the balance account has not been favorable in the past several years and casts a shadow on the "effective operation" of funds. As seen in Table 3, the Trust Fund Bureau's efficiency in fund operations is decreasing and in FY-78 and FY-79, tumbled and showed big deficits. The deficits were covered by the reserve fund of 82.6 billion yen and decreased to 34.9 billion yen at the start of FY-80. There is a possibility that the deficit will continue in FY-80 and if this trend cannot be broken, it might become difficult for the Trust Fund Bureau special account to be self-supporting.

Table 3.

Income and Expenditures of Trust Fund Bureau Special Accounts (FY, Billion Yen)

Items	1976	1977	1978	1979	1980
(Income)	32,921	40,354	47,357	54,455	65,357
Interest on Securities and Loans	32,844	39,987	46,749	54,379	--
Profits from Sale/Redemption of Securities	63	349	590	64	--
Fees for Receivable Accounts	13	18	17	13	--
(Expenditures)	32,868	40,330	47,626	54,664	65,357
Interest on Deposits	32,848	40,308	47,603	--	--
Miscellaneous Expenses	--	--	--	54,639	65,329
Administrative Expenses	20	22	23	25	27
Balance	53	24	▲ 269	▲ 208	0

Note: FY-80 represents budget; prepared from "Public Finances and Fiscal Statistics Monthly"

Increase in Nonessential Funds and Carried-Over Funds

The reasons for the deficit in the Trust Fund Bureau special account are the disuse of the estimated amount for long-range operations and the accumulation of a large sum to be carried forward. Of the bureau's funds, the amount intended for long-range operations of over 5 years must be approved by the Diet and used for fiscal investments and underwriting government bonds. Thus, funds not used for fiscal investments are practically returned in toto to the Trust Fund Bureau.

For long-term operation, the difference between cost of money and investment yield is so established that the investment income is somewhat higher than deposit interest, etc. Therefore, short-term operation, including surplus funds, determines the account balance. Accumulation of unused funds intended for long-term operation and increase of short-term operational funds aggravate a poor balancesheet.

There are two types of short-term operations: one is loans to special accounts and the other is use of surplus funds. Surplus funds are used, in coordination with the Bank of Japan, for buying and selling of short-term and long-term government securities.

At the end of FY-79, short-term operational funds amounted to nearly 15 trillion yen or 17.7 percent of the total capital. Of the funds, the special allotment account for local allocation tax was 7 trillion yen and the welfare insurance special account was 1 trillion yen, occupying a major share of the short-term loan funds. The special account borrows from the Trust Fund Bureau the allotment account for the local allocation tax to supplement the financial resources of local governments and distributes the funds to local public bodies as local allocation taxes. This being the case, however, as Yukio Noguchi, assistant professor of Hitotsubashi University points out, it is possible for the Trust Fund Bureau to manipulate funds in the red, and measures to cope with the basic causes of deficits (local allocation taxes and insurance systems) will be ignored.

A bigger problem is that because Trust Fund Bureau funds are hardly disclosed, they can be easily misappropriated. In addition to these special accounts, short-term loans to the Japanese National Railways are made and as surfaced in the February Lower House Budget Committee meeting, they were used temporarily to supplement interest payments by the Housing Loan Corporation.

There is no assurance that these short-term loans will be repaid, and funds cannot be said to be "used in a reliable and profitable way." Including long-term operational usage, many of these loans would be classified by nongovernmental institutions as "bad loans."

Problems Involved in Underwriting of Government Bonds

Other reasons for the deterioration in income and expenditures of the Trust Fund Bureau are the increase in short-term government bonds and the increase and lengthy deposit period of postal savings. (See Table 4.)

Table 4.

Increase in Underwriting of Government Bonds by Trust Fund Bureau
(Unit: FY, Billion Yen, %)

Items	1975	1976	1977	1978	1979	1980	1981
Amount of Government Bonds Issued	52,805	71,982	95,612	106,740	134,720	142,700	122,700
Amount Underwritten by Trust Fund Bureau	8,400	10,138	10,000	3,000	26,641	32,000	35,000
Share Underwritten	15.9	14.1	10.5	2.8	19.8	22.4	28.5

Note: Based on income; estimated amount for FY-80 and FY-81.

With surplus funds of over 2 months, the Trust Fund Bureau is trying to use the money effectively through purchases of long-term government bonds from the Bank of Japan. However, to prepare for seasonal loans such as special accounts, the bureau must retain fluidity and so the possession of short-term government bonds is increasing. Since the interest on short-term government securities is regulated at a low rate, the back spread cannot be avoided.

The lengthening of the deposit period of postal savings also creates pressure on the balance account. The reason is that as the deposit period extends, the interest rate climbs gradually from 2 percent to a high rate. If short-term government bonds were purchased with the high-interest postal savings which increased drastically in FY-80, it is almost hopeless to improve the balancesheet.

The increase in underwriting of government bonds is a recent problem of the Trust Fund Bureau. Since nongovernmental fiscal institutions reached the limit of their capability to absorb government securities, in FY-79 the bureau began in earnest to purchase them. The estimated purchase for FY-81 is 3.5 trillion yen. With the reassessment and flexibility of fiscal investment organs, nongovernmental financial organizations are seeking to increase the purchase of government bonds, but can they support the plan unconditionally?

In contrast to the underwriting by nongovernmental institutions, utilizing postal savings to purchase government bonds will not increase the money supply, since the savings are a form of monetary deposit. Also, the difference between receipts and payments of public financial funds should be narrowed.

These are favorable factors but it is possible that the underwriting of government bonds by the Trust Fund Bureau induces easy issuance of government securities. To plan to increase postal savings to underwrite government bonds is to mistake the means for the end. Similarly, to sell government bonds already in possession to the Bank of Japan in order to purchase newly issued securities is tantamount to underwriting by the Bank of Japan and is not officially approved.

The underwriting of 3.5 trillion yen in FY-81 was done in anticipation of the sudden increase in postal savings in FY-80. Hereafter, the problem of purchasing government securities must be reevaluated simultaneously with fiscal investments.

In any case, at this time of "financial reconstruction," why should large sums of money be lent at low interest to special juridical bodies when huge nonessential funds and carryover funds are piling up? The problem requires an urgent remedy not only from the standpoint of effectively utilizing pension reserve funds but to improve operations of public finances.

9134
CSO: 4105/151

LIBERAL DEMOCRATIC PARTY REVIEWING CIVIL AVIATION POLICY

Tokyo JPE AVIATION REPORT-WEEKLY in English No 521, 13 May 81 p 1

[Text]

The ruling Liberal-Democratic Party will shortly ask the Ministry of Transport (MOT) to change Japan's civil aviation policy. This request is expected to give impetus to some concrete step toward a policy change because the aviation industry has already made similar requests to the MOT on various occasions.

Under the current basic MOT guidelines, based on a cabinet decision in 1970 and a Transport Ministry directive in 1972, Japan Air Lines (JAL) is engaged in international and domestic trunk service. All Nippon Airways' (ANA) service covers domestic trunk, and local services and short-haul international charter flights, while Toa Domestic Airlines' (TDA) business areas are limited to domestic local and some trunk routes.

Proposals now under study by the LDP are expected to call for more carriers for international flights, JAL's access to part of the domestic local-route market, and TDA's greater access to domestic trunk routes. At present, TDA's trunk service covers only Tokyo-Sapporo and Tokyo-Fukuoka routes.

LDP executives are about to request the party's special committee on aviation officially to pressure the MOT into the policy change. The committee plans to meet in June to finalize its recommendation on an aviation policy change for presentation to the MOT.

A main factor behind carriers' and the LDP's requests for policy alteration is a dramatic change in circumstances surrounding civil aviation since the 1970 cabinet decision. Although air traffic was scoring double-digit year-to-year increases around 1970, traffic demand began to decline sharply in early 1980 both on domestic and international routes. In the process, business performance of two domestic carriers -- ANA and TDA -- has worsened. Both of them are expected to suffer losses in the current fiscal year started in April 1981 if some policy changes do not occur.

The change in circumstances over the past decade has led MOT officials also to consider reviewing the current aviation policy. Therefore, extensive policy alteration is expected within this year. Prior to the alteration, the three carriers are likely to vie for greater service rights.

CSO: 4120

SCIENCE AND TECHNOLOGY

CHARACTERISTICS OF FAST AXIAL FLOW CO_2 LASER DESCRIBED

Tokyo REZA KENKYU [THE REVIEW OF LASER ENGINEERING] in Japanese Vol 1, No 1, Jan 81 pp 21-30

[Article by Hiroyuki Sugawara, Koji Kuwabara, Satoshi Takemori, Toshiharu Shirakura, Koji Sasaki and Norio Ikemoto of Hitachi, Ltd: "Development of a Highly Efficient Fast-Axial-Flow CO_2 Laser--Characteristics and Outline of a 2.5 kW Prototype CO_2 Laser"]

[Text] 1. Introduction

There are already CO_2 laser systems capable of 15 kW continuous high output [1, 2] which have appeared in the market and are finding applications as heat source in production systems, but various modifications and improvements such as improved efficiency, stabilized output, and miniaturization are in order before more widespread application can be realized.

With the introduction of the cooling method involving forced circulation of gas from the discharge section--the so-called high speed gas flow type--the CO_2 laser system has become a general industrial use facility of several kW magnitude, and this type of laser is classified as axial flow type or cross flow type depending on whether the gas is blown in the axial direction of the laser beam or orthogonal to the laser beam [3]. Excluding the type [4] in which discharge control is exercised with an electron beam, the 5-6 kW laser [5-7], for both types are commercially marketed. The large output lasers of the 10-20 kW class are said to be most compatible with the cross flow type. It is the authors' knowledge that there are no examples of research conducted on 10-20 kW class facilities of the axial flow type. Axial flow type lasers require large facilities, and as a result very large blowers are required for forced gas circulation. Therefore, this type of laser is said not suitable for large output application. On the other hand, the stability and efficiency of discharge, output, and mode are high, giving this laser some superior basic attributes for general industrial use.

The authors replaced the funnel-shaped blower used in the past with a turbo type blower which will provide the large air flow which is required for the large output in the future. At the same time, we test-developed a high speed axial flow type 2.5 kW CO_2 laser of a small size, an improvement over the shortcomings of the past axial flow type lasers, and the outline of this facility along with the characteristics of the high speed axial flow CO_2 laser measured on this facility are described below.

2. Test Produced Facility and Principal Components

2.1 Outline of Facility

The makeup of the fast axial flow CO_2 laser facility which was test developed is diagrammed in Figure 1. The system is comprised of the resonator system consisting of the output mirror, totally reflecting mirror, and deflecting mirror; four sets of discharge tubes; two turbo blowers; and two heat exchangers together with the distribution line system which ties together these various components. The discharge tubes are deployed in two sets of two tubes with each discharge tube being equipped with electrodes at both ends. Negative electrode type high voltage is impressed on the electrode to the center side, and the tube is excited with a DC glow discharge. The gas elevated to high temperature within the discharge tube flows along the pathway designated by the arrows in the figure. In other words, the gas propelled by the two sets of blowers passes through the insulating tube and through the discharge tubes where the gas flow separates between the separate tubes. The gas heated to elevated temperature in the discharge tubes is cooled at the heat exchangers and returns to the blowers. Thus, the closed cycle is formed. A fraction of the gas is normally drawn off by the vacuum pump and exchanged, and there is a catalyst placed in the upstream portion of the high temperature gas in the heat exchanger to be used for gas regeneration to regenerate the CO_2 which is dissociated by the discharge. As a result, it is possible to maintain sealed operation during the course of a day's (8 hours) operation. The discharge experiments and output experiments described below were all conducted under this sealed operation setup.

The optical system has 2 deflecting mirrors which deflect laser rectangularly and the resonator has 2 rows of discharge tubes connected in DC circuit. This is a stabilized resonator which uses ZnSe with a 50% reflection factor as an output mirror.

In order to minimize the overall length of this facility, the insulating tube of this facility has been installed vertically at the center instead of in the axial direction of the discharge tube.

A photograph of the facility taken from above is shown in Figure 2 while representative specifications and characteristics of the facility are listed in Table 1.

2.2 High Speed Rotary Turbo Blower and Gas Flow

A high speed rotary turbo blower capable of operating at 18,000 rpm was developed for use in the CO_2 laser which was test produced.

The main reasons are as follows:

i) A centrifugal type blower is more suitable for providing air flow of large output volume.

ii) This is not a volume type but a centrifugal type such that there are no pulsations in the gas flow. Therefore, the discharge is stable.

iii) Vibration is minimal.

On the other hand, it is more difficult to obtain a large head with a centrifugal type compared to a volume type. Consequently, there is need to reduce head loss to the discharge tubes and the various sections of the distribution lines as well as to maintain adequate balance with the head gas-flow characteristics of the blower.

A design analysis program concerned with centrifugal type flow machinery was used to design and manufacture turbo fans suitable for use with the low pressure gas mixture of CO_2, N_2, and He in the blower. A photograph of the external appearance of a turbofan is shown in Figure 3. The stator and the rotor of the motor of this blower are placed in the laser gas atmosphere, and there is no rotary axis seal mechanism.

The adiabatic head-flow characteristics relationships for both measured and calculated values together with the relationships between head loss-flow characteristics for both the calculated and measured cases for this test produced blower are shown in Figure 4. A flange top type orifice was used for the flow measurement. The blower adiabatic head during 2.5 kW output was about 2,300 kgf·m/kg, and the gas flow per blower was 0.88 m^3/s. This figure shows the gas flow to be lower during discharge than during no discharge, and this behavior is the result of volume expansion of the gas due to heating during discharge causing increased flow at the discharge tube outlet and increased head loss.

The results of gas flow velocity distribution measurements within the discharge tube made at the discharge tube inlet (anode side) are shown in Figure 5. Because the insulating tube was mounted vertically in this test facility, the gas flow makes a right turn just before the discharge tube. In view of this situation a honeycomb type rectifying plate was installed to the upstream side of the anode to rectify the flow to a uniform state in the axial direction. In addition, the orifice type electrode with windows which will be described later and the nozzle effect of the discharge tube inlet section came into play, and the flow velocity distribution differential was less than 2 m/s between the up and down directions at the discharge tube inlet section as shown in the measured results of Figure 5.

2.3 Electrode Construction and Discharge Injection Power Limits

There are limits to the electrical power which can be injected into the discharge tube without changing glow discharge to an arc discharge, and a study was made to determine the extent these limits varied depending on the electrode construction. The changes in discharge patterns with selected electrode constructions are shown in Figure 6. All the electrode constructions shown in Figure 6 were of the upstream side anode (high voltage side) type, and the electrode surfaces other than those serving as the anode surface were coated over with insulating material. The cathode to the downstream side (low pressure side) was a cylindrical ring with diameter roughly equal to that of the outer diameter of the discharge tube. Both the anode and cathode were made of copper.

The results of measurements of discharge injection power limits for the electrodes shown in Figure 6 are shown in Figure 7. The judgment of injection power limit which is the judgment of the limits of the transition from glow discharge to arc discharge is rather difficult to make because this transition takes place rather gradually. The method used in this present study was to record the current on an XY recorder and take the current value when the timewise variation amplitude of current reached 4 mA.

Figures 6 and 7 are explained in greater detail below.

The ring-shaped electrode with the same diameter as the inner diameter of the glass tube is installed at the end of the glass tube, and this ring inner surface is used as the anode. The gas flow directed in the direction of the arrows shown in the figure causes the discharge to approach the outer walls and form a hollow and cylindrical discharge. The current density at the circumferential section becomes large as a result, and the injection power limit at 15 Torr was about 1.2 kW and rather low as shown in Figure 7.

The orifice-type electrode is a ring-shaped electrode which is positioned more to the upstream side than the ring-type electrode and is designed so that the gas flow will become an eddy flow after it passes through the electrode by which means a homogenization of the current density is achieved. There is some relaxation in concentration of discharge near the tube terminal as a result, and the discharge injection power also sees some increase as seen in Figure 7.

The next cylindrical type electrode is one in which gas also flows in from the outside of the cylinder of the electrode in an effort to draw the discharge to the direction of the central axis. As seen in the photograph of Figure 6, the discharge is drawn closer to the central axis compared to the ring-type and orifice-type, and the injection power limit also somewhat increased.

The orifice with window-type electrode combines the effect of an orifice which generates an eddy flow as the gas passes through the electrode and the effect of cylindrical type gas flow created by gas blown in from the outside, and a photograph of this orifice with window-type electrode is shown in Figure 8. As seen in the photograph of Figure 6 the net effect is that the glow is distributed uniformly from the discharge tube inlet section with accompanying increase in discharge injection power limit. At the same time, there is a large effect of thickness of the electrode on this discharge injection power limit, and an example of the change in electrode thickness on the discharge injection power limit of this orifice with window-type electrode is shown in Figure 7.

According to the results of the tests described above, the pressure at which maximum injection power can be obtained could be raised up to 30 Torr. On the other hand, raising the pressure lowered the small signal gain as will be discussed later, and 25 Torr was adopted as the standard pressure for this test facility. The maximum injection power at this time was 3.0 kW which was 1.4 W/cm^3 per unit volume or 330 W/(g/s) per unit mass flow.

There is a paper by R. McLeary, et al. [8] who reported success in activating a CW-CO$_2$ laser under atmospheric pressure by placing the cathode surface in a narrow slot section and passing gas through at sonic speed in an axial flow type system, but the head loss at the narrow slot section became so large that the blower capacity had to be made so large. As a result, the overall efficiency decreased. Therefore, the authors did not pursue this approach.

2.4 Positive Column Potential Gradient

The excitation of gas in glow discharge occurs as a result of the collision of the gas with electrons accelerated at the electric field within the glow discharge positive column, and the potential gradient becomes an important factor in the study of excitation efficiency. The results of potential measurements along the discharge tube inner axis using an electrostatic probe are shown in Figure 9. The cathode was a circular cylinder which was positioned coaxially with the glass tube.

According to the results shown in Figure 9, the average positive column potential gradient was 10.6 W/Torr·cm and was roughly uniform between the cathode and anode. This uniformity in the electric field made possible the selection of the optimum gas mix ratio for the entire discharge region, and this is thought to be one of the factors responsible for the high efficiency of the axial flow type.

2.5 Current Density Distribution Within the Positive Column

A floating double probe was used to measure the current density distribution within the discharge tube. The results of these measurements are shown in Figure 10.

A slight effect of the anode shape is seen at the inlet section of the discharge tube (anode side), but the current distribution is close to that of a second order curve in the latter half from the center. The current density is high along the central axis as demonstrated above in the axial flow type. Since this section is the center of the resonant optical axis, the excited CO_2 molecules contribute effectively to the oscillation, which is thought to be one of the factors responsible for high efficiency.

3. Laser Oscillation Characteristics

3.1 Laser Oscillation Characteristics

Representative output behavior of the test produced facility are shown in Figure 11 and Figure 12. The laser output with respect to the injection power for the discharge when the gas pressure was changed is shown in Figure 11 while the laser output when the blower rpm, that is, the gas flow, was changed is shown in Figure 12.

When the discharge injection power was 9.6 kW at 25 Torr and 18,000 rpm, a 2.5 kW laser output was obtained. The maximum output was 3.1 kW when the discharge injection power was 13 kW. At the same time, the laser output efficiency with respect to the discharge injection power at 2.5 kW output was 26 percent.

3.2 Output Mode and Diffraction Angle

The so-called acrylic burn pattern which is a pattern of the scars left when a laser beam is irradiated on an acrylic plate is shown in Figure 13. According to this burn pattern, the lateral mode of this test produced facility showed a strong central beam section plus two other ring-shaped sections of high intensity. There was also a roughly 2 mm wide ring-shaped stripe seen at the outer edge of this burn pattern, and this was thought to be a diffraction band arising at the total reflection mirror. According to these observation results, the mode of this test produced facility was based on TEM_{02}. As is evident from Figure 13, the diameter of this beam was about 50 mm.

The results of diffraction angle measurements performed on this beam are described next. A practical and useful method to judge beam quality is the diffraction angle of the beam. When a beam of diffraction angle θ (half angle) is passed through a lens of focal length f, the beam diameter d at the focal point is given by the following equation:

$$d = 2 f\theta \tag{1}$$

Equation (1) was used in reverse manner in order to determine the diffraction angle of the beam. That is to say, a concave mirror of focal length f = 750 mm was used to converge the beam, and the minimum beam diameter or spot diameter was measured and substituted into equation (1) to obtain the diffraction angle. Now, the measurement of spot diameter should be of the diameter at the section the central intensity is $1/e^2$, but this measurement was difficult. As a result, an acrylic burn pattern was made, from which the spot diameter was determined through the width of the burn scar. The results of these measurements gave d = 1.12 mm and θ = 0.75 mrad.

3.3 Gain

A study was made with this facility to determine the manner in which the fast axial flow CO_2 laser's small signal gain α_0 and saturation parameter I_s are influenced by the gas pressure or the gas flow.

The small signal gain and saturation parameter were estimated from the laser output P_L versus discharge injection power P_E characteristics curve.

When beam intensity I is sufficiently large such that $I \gg I_s$, the rate of increase in beam intensity per unit length becomes independent of beam intensity and is $\alpha_0 I_s$. This value will hereafter be referred to as saturation gain with respect to small signal gain and be represented by u_s (W/cm^3). Next, we assume that small signal gain α_0 and saturation gain u_s are proportional to the power density ω (W/cm^3) injected by discharge per unit length as depicted below.

$$\alpha_0 = \alpha_e \omega \tag{2}$$

$$u_s = u_e \omega \tag{3}$$

Then the relationship between laser output P_L and the discharge injection power P_E characteristic is given in the following manner:

$$P_L = \frac{u_e}{1 + \frac{1}{1-R}\left(\frac{1+R}{2} - \eta r + r_0\right)} P_E - \frac{u_e}{\alpha_e}\frac{1-R}{1+R} S \tag{4}$$

Here P_E: discharge injection power (W)
P_L: laser output (W)
R: output mirror reflection rate
n: number of beam reflections by metal mirror
r: loss per single reflection at metal mirror
S: cross-sectional area of discharge (cm^2)

Equation (4) shows that P_L increases linearly with P_E. Therefore, the measurement of the P_L - P_E characteristics from Figure 11 or Figure 12 should yield the minimum discharge injection power P_{E0} at which the laser beam is generated. Also, with the slope dP_L/dP_e of the linear section of the curve showing the increase in laser output P_L with P_e should make possible the determination of α_e and u_e.

Experimental runs were conducted varying discharge tube diameter between 40 mm, 50 mm, and 65 mm; gas flow at blower operation between 12,000-18,000 rpm; and pressure between 15-25 Torr in order to determine how these various factors influenced the power coefficient α_e of small signal gain and the power coefficient u_e of saturation gain. In this situation, a value of $r = 0.014$ was assumed for equation (4). The results of these measurements are shown in Table 2.

The value of u_e ranged between 0.28-0.35 and was essentially constant while α_e varied widely with discharge tube diameter, pressure, and blower rpm. The changes in α_e with pressure are illustrated in Figure 14. It is seen that α_e decreased with increasing pressure at each tube diameter and blower rpm. Next, the effect of gas flow given as the abscissa on α_e is shown in Figure 15. The effects of the discharge tube diameter and blower rpm were thought to be due to changes in the gas flow rate.

At the standard specifications of 25 Torr pressure, blower speed of 18,000 rpm, and discharge tube diameter of 65 mm, the values of α_e and u_e are: $\alpha_e = 0.0071$ (1/cm)/(W/cm^3), and $u_e = 0.35$. While at injection power density 1.11 (W/cm^3) during 2.5 kW output, the small signal gain α_0 was 0.79 (%/cm) and the saturation parameter I_s was 49 (W/cm^2). At the same time, the average beam intensity within the resonator was 214 (W/cm^2), and this was 4.4 times the saturation parameter I_s.

4. Penetration Depth

Because laser light is associated with high density power, it can be utilized in welding and cutting operations. On the other hand, its high power density conversely makes difficult the measurement of spot diameter and power density. This is why the performance is greatly controlled by the power density of the beam spot, and this characteristic will be described in terms of an example of the measurement of welding performance as a representative application example.

Laser beam was directed at 300 stainless steel, and the penetration depth was measured. The results are shown in Figure 16. Ar gas was used as assist gas. The optical system consisted of a convex mirror and a concave mirror combination which reduced beam diameter to one-third. After this, a focal distance 75 mm KCl lens was used to squeeze down the beam. The power displayed in this figure is that which was present after passage through this optical system. Representative cross-sectional photographs depicting the manner of penetration are also shown in this figure.

5. Post Statements

The general description and characteristics of the 2.5 kW high speed axial flow type CO_2 laser which was test produced were described along with the results of measurements on the various characteristics of this CO_2 laser. These descriptions have been extremely limited due to the limitations in space, and we hope to report on the details and results in a separate paper.

We take this opportunity to thank Professor Chiyoe Yamanaka of Osaka University for his guidance in the development of this CO_2 laser facility.

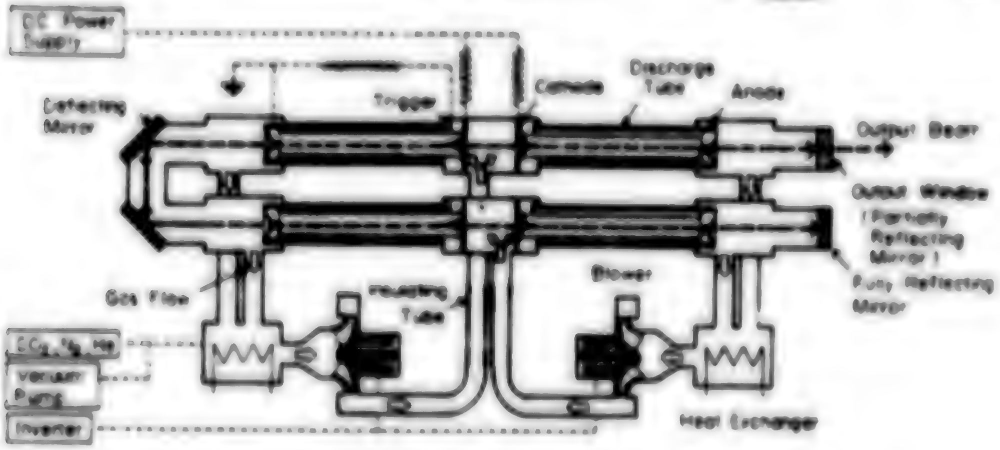


Fig 1 Diagramatic sketch illustrating the constitution of a 2.5kW fast-axial-flow CO_2 laser system

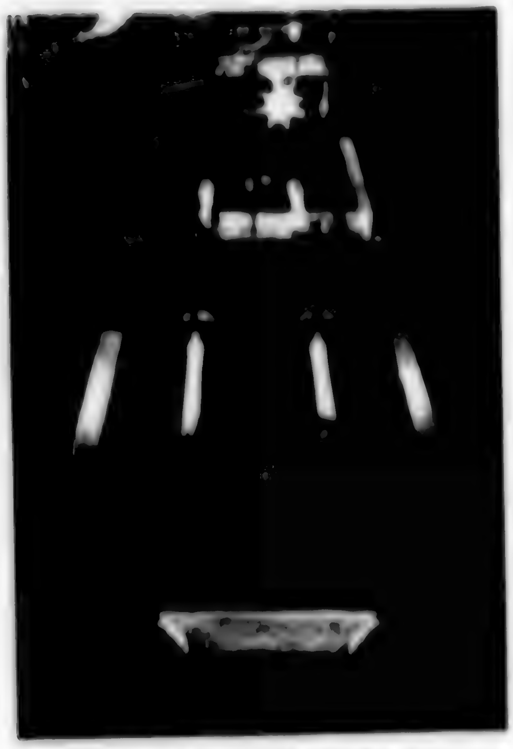


Fig. 2 A 2.5 fast-axial-flow CO_2 laser

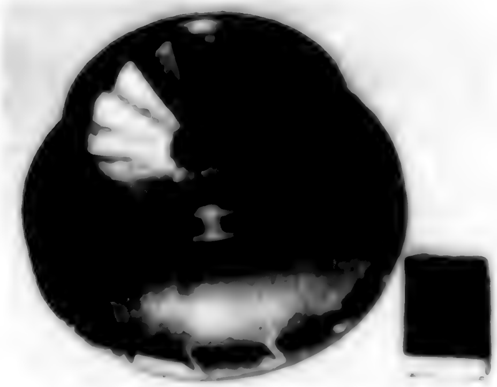


Fig. 3 A turbofan for the CO_2 laser

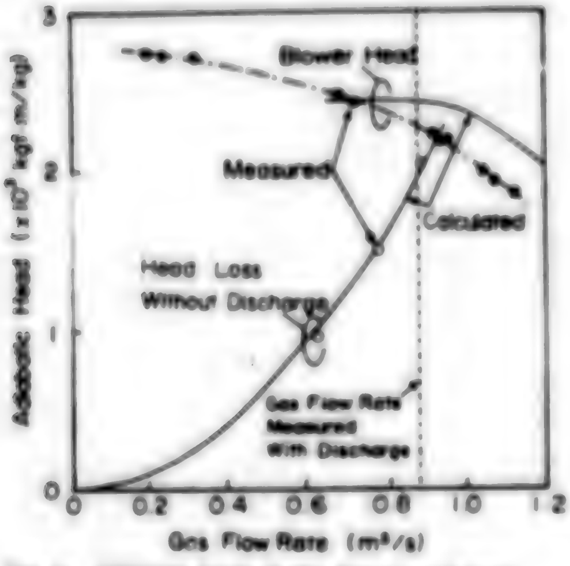


Fig. 4 Adiabatic head of the blower and head loss of the flow system versus gas flow rate

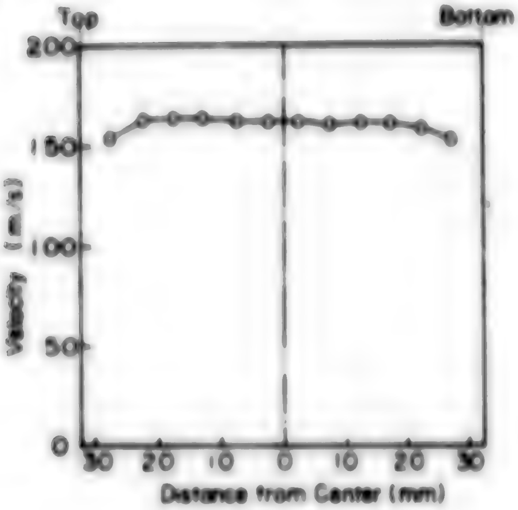


Fig. 5 Gas flow velocity distribution at entrance discharge tube

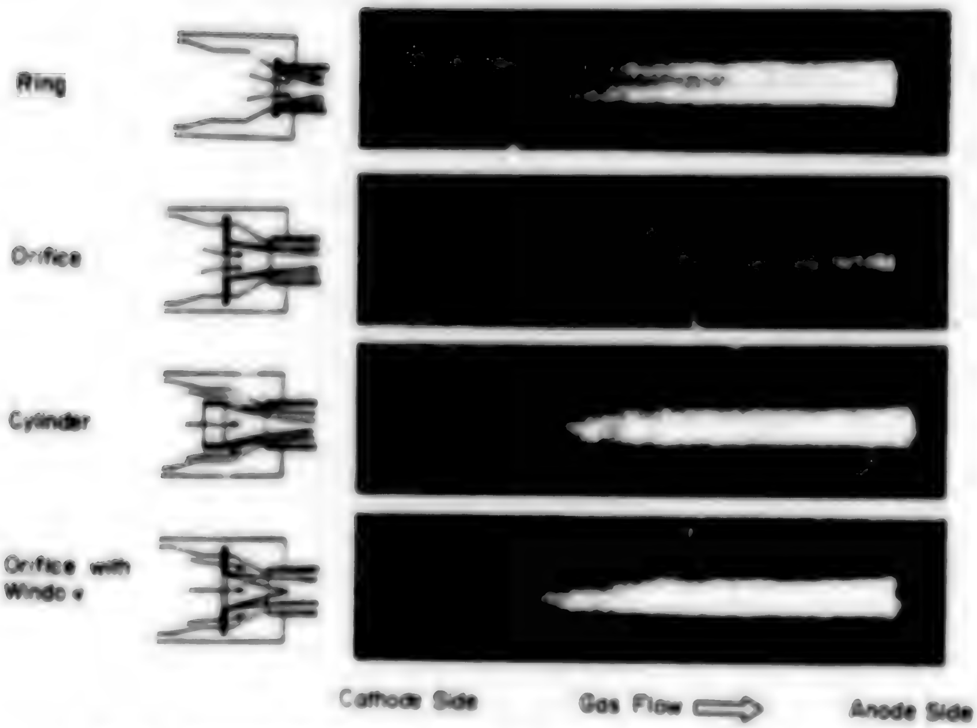


Fig. 6 Photographs of glow discharge with various cathodes in structure

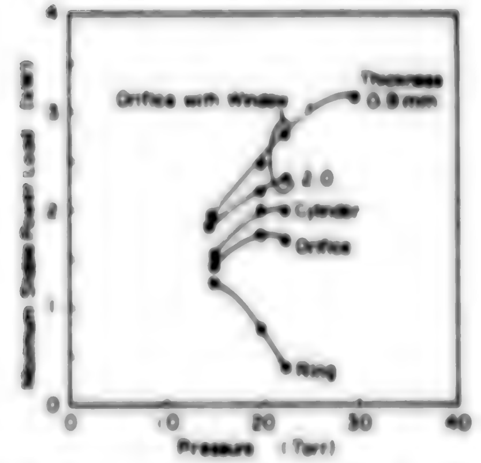


Fig. 7 Power load limit characteristics of discharge with various cathodes in structure as function of gas pressure

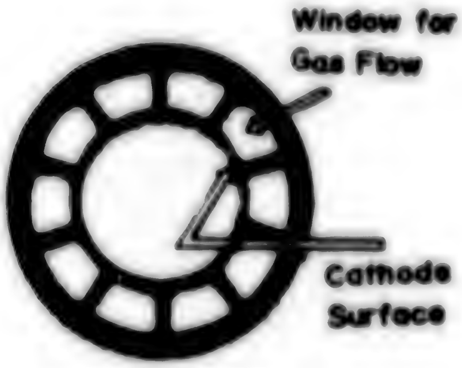


Fig. 8 An orifice type of cathode with windows for gas flow

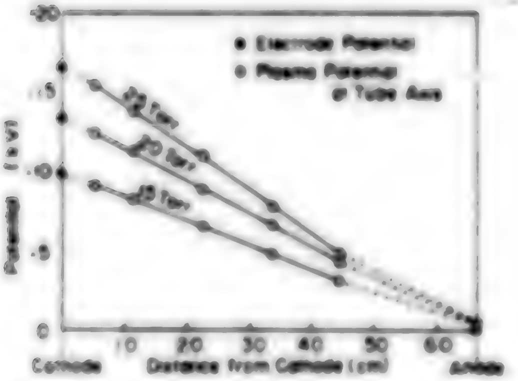


Fig. 9 Electric potential distributioins along tube axis for various Pressures

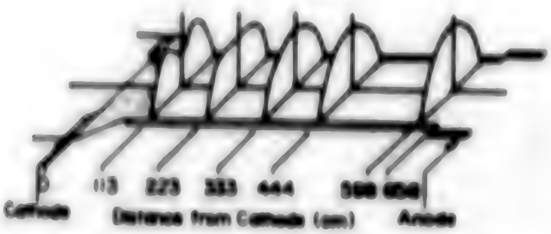


Fig. 10 Current distributions at various places along tube axis

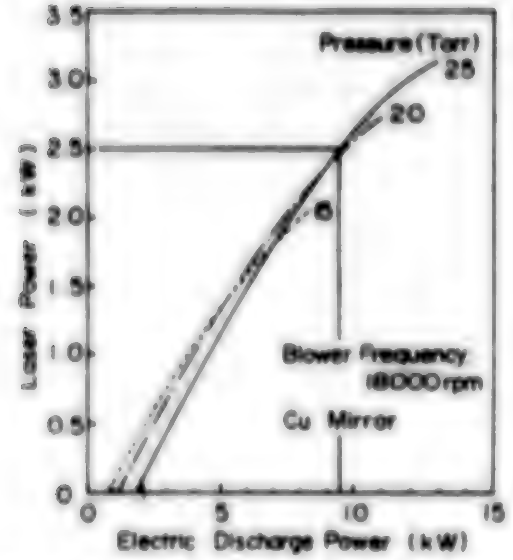


Fig. 11 Power output behavior as a function of electric discharge power for various pressures

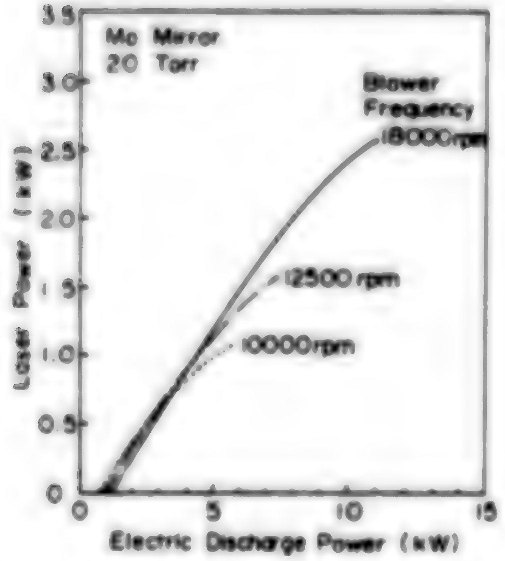


Fig. 12 Power output behavior as a function of electric discharge power for various gas flow rates

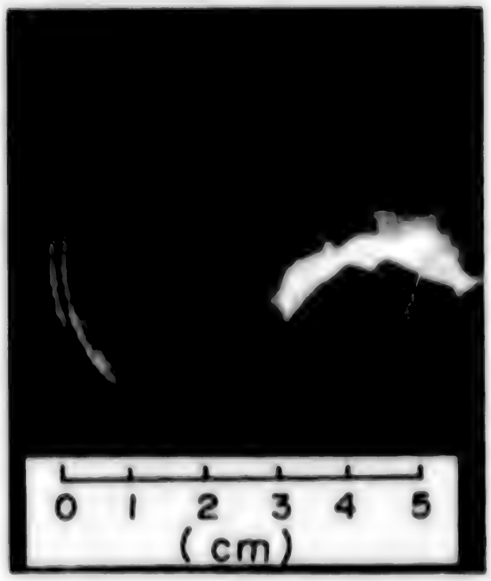


Fig. 13 Burn pattern of output beam in a plastic block

Tadle 2 Characteristics of the active medium

Diameter of Discharge Tube (mm)	Pressure (Torr)	Blower Frequency (rpm)	Small−Signal Gain Coefficient ((1/cm)/(W/cm²))	Saturation Gain Coefficient
40	15	18000	0.0108	0.318
	20	18000	0.0078	0.318
50	15	18000	0.0140	0.327
	15	18000	0.0184	0.329
	20	15000	0.0102	0.329
	20	18000	0.0116	0.329
	20	15000	0.0132	0.318
	25	12500	0.0066	0.346
65	15	18000	0.0160	0.350
	15	18000	0.0186	0.320
	15	15000	0.0197	0.318
	15	12500	0.0285	0.285
	20	10000	0.0106	0.340
	20	15000	0.0113	0.334
	20	12500	0.0135	0.320
	20	10000	0.0171	0.287
	25	18000	0.0071	0.351
	25	15000	0.0084	0.351

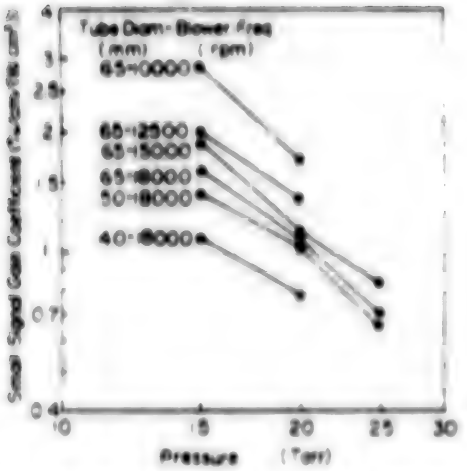


Fig. 14 Small-signal gain coefficient behavior as a function of pressure for various tube diameters and blower frequencies

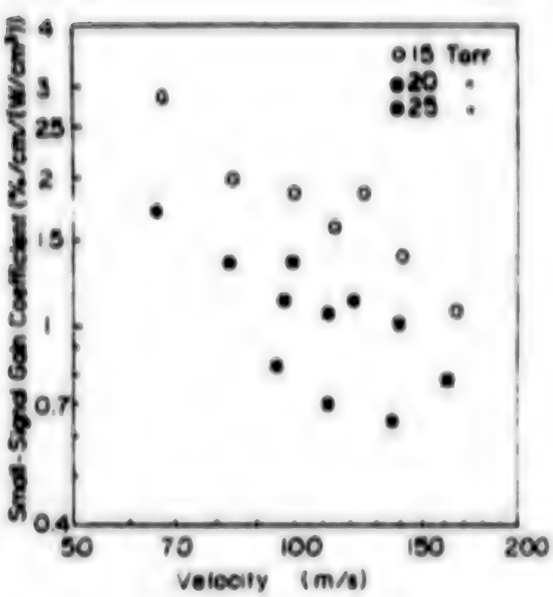


Fig. 15 Small-signal gain coefficient behavior as a function of flow velocities for various pressures

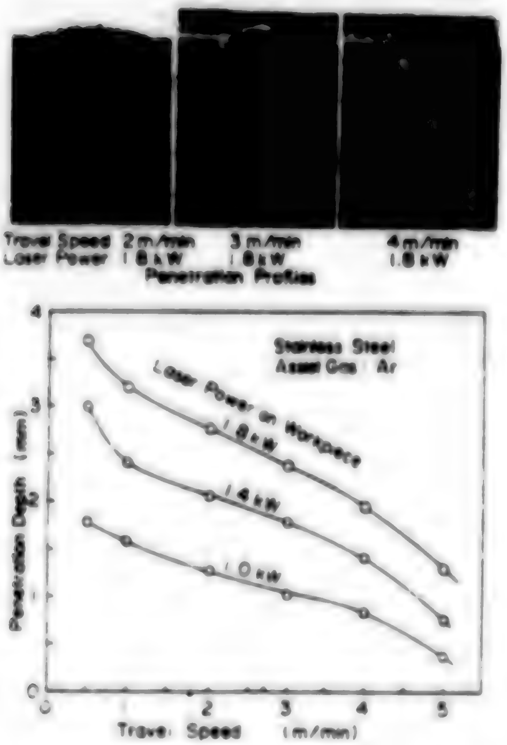


Fig. 16 Laser weld penetration characteristics as a function of travel speed for various laser power

BIBLIOGRAPHY

1. E. Hoag, H. Pease, J. Staal and J. Zar: APPL. OPT., 13 (1974) 1959.

2. Technical Proposal presented by AVCO.

3. A. J. Demaria: proc. IEEE, 61 (1973) 731.

4. E. R. Pugh, J. Wollace, J. H. Jacob, D. B. Northam and J. D. Dangherty: APPL. OPT., 13 (1974) 2512.

5. I. J. Spalding: 5th Int. Conf. on Gas Discharge, IEE Conf. Pub. No 165 (1978) 11.

6. W. C. Ball and C. M. Banas: National Aerospace Eng. and Man. Meeting, SEA-740863 (1974).

7. R. C. Crafer and J. T. Pauley: The Welding Ins. Res. Bulletin (1979).

8. R. McLeary and W. E. K. Gibbs: IEEE J. QUANT. ELECTRON. QE-9 (1973) 828.

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SCIENCE AND TECHNOLOGY

NATION'S TOP AEROSPACE INDUSTRY LEADERS TO ATTEND PARIS SHOW

Tokyo JPE AVIATION REPORT-WEEKLY in English No 521, 13 May 81 p 2

[Text]

Approximately 50 senior executives representing Japanese aerospace firms, including Eiichi Ohara, Chairman of Fuji Heavy Industries Ltd, and also Chairman of the Society of Japanese Aerospace Companies (SJAC), will be at Le Bruguet during the coming Paris Air Show, June 4 through 14.

Besides Ohara, Japanese industry VIPs including Kozo Hirata (Managing Director of SJAC) Shigeo Wada (President of Tokyo Koku Keiki Co.), Shigetomo Kawai and Kyosuke Toyota of Japan Aviation Electronic Industry Co. (President and Executive Director), Masaharu Shimizu and Shoichi Sekiguchi of Hokushin Electric Co. (President and Deputy General Manager--Aviation), Osamu Nagano, Kaneichiro Imai and Masami Hamanaka of Ishikawajima-Harima Heavy Industries Ltd.'s Aircraft Engine Div. (Advisor, Executive Director and General Manager) and other top leaders of Japan's aerospace industry are scheduled to attend the show.

More than ten Japanese journalists from the aviation specialty press will also be visiting Le Bruguet to report on the air show.

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SCIENCE AND TECHNOLOGY

SELECTION OF RJ500 COMPONENTS SUPPLIERS COMPLETED

Tokyo JPE AVIATION REPORT-WEEKLY in English No 521, 13 May 81 pp 2,3

[Text]

Selection of manufacturers which will undertake development and production of major components of the Rolls-Royce/Japan RJ500 turbofan engine has almost been completed. The names of the selected manufacturers and the items they will handle, according to Japanese sources, are as follows:

ITEM	MANUFACTURER
Low pressure fuel pump	Dowty Fuel Systems Ltd. (U.K.)
High pressure fuel pump	"
Hydraulic fuel control systems	Hamilton Standard Div., United Technologies International Inc. (U.S.)
Variable control acutuator	Dowty Fuel Systems Ltd.
Fuel distributor/drain valve	Hamilton Standard Div.
Electronic fuel control systems	Dowty Smiths Industries Controls Ltd. (U.K.)
Starter valve	Lucas Aerospace Ltd. (U.K.)
Ignition systems	Lucas Aerospace Ltd. and Yokogawa Aviation Co. (Japan)
Fan speed measuring equipment	Shinko Electric Co. (Japan) and Weston Instruments Co. (U.K.)
Speed measuring equipment for high pressure systems	"

ITEM	MANUFACTURER
Exhaust gas temperature meter	Toshiba Corp. (Japan) and Weston Instruments
Vibration indicator	Vibro-Meter SA (Switzerland)
Fuel-oil heat exchanger	Sumitomo Precision Products Co. (Japan)
Fuel temperature transmitter	Lewis Engineering Inc. (U.S.)
Oil temperature transmitter	"
Fuel pressure warning switch	Smiths Industries Ltd. (U.K.)
Oil pressure transmitter	"
Fuel filter pressure switch	"
Oil pressure warning switch	"
Oil filter pressure switch	"
Fuel filter elements	Aircraft Porous Media Europe Ltd. (U.K.)
Oil filter elements	"

The manufacturers of the indicator for the oil tank, drain tank, high pressure turbine overheat switch and the air starter have yet to be selected. Overall integration of the fuel control systems will be the responsibility of Rolls-Royce Limited.

CSO: 4120

NEW MAT ENGINEERING DEVELOPMENT TO START IN FY 1982

Tokyo JPE AVIATION REPORT-WEEKLY in English No 521, 13 May 81 p 8

[Text]

The TR&DI's program for development of a new antitank missile (MAT) is expected to enter the engineering development stage in FY 1982 as technical research on the new MAT has been making smooth headway.

The new MAT is of the third generation following the Model 64 MAT and Model 79 antitank/ship missile. Although its performance requirements have not been revealed, it is expected to feature a shorter flight time and a larger destructive power using laser semiactive guidance system. A command post equipped with the laser illuminator will be separated from a MAT launching base.

The new MAT development program started in 1976. The second and final test fabrication, launched in FY 1980, is scheduled to end in the current fiscal year. The program is estimated to cost a total of ¥8,000 million. The original scheme of the TR&DI and GSDF had envisaged the start of the engineering development in FY 1981 with the service entry set for FY 1986. But indications are that the program will be completed some one year behind schedule.

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